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EXAMINER

RUDE, TIMOTHY L

ART UNIT

PAPER NUMBER

2871

DATE MAILED: 04/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/737,770

Applicant(s)

SONG, IN-DUK

Examiner

Timothy L Rude

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 March 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Claims and Claim Objections

1. Claim 1 is canceled. Claims 2, 3, 4, 7, 8, 9, 10, 12, 17, and 35 are amended necessitating new grounds of rejection. The rejections of claims 12-16 under 35 U.S.C. 112, first paragraph, are withdrawn.

Claim 14 is objected to because of the following informalities: the recitation "the common electrode is on the passivation layer" is contradictory to base claim 4. For examination purposes, the recitation will be interpreted as -- the *pixel* electrode is on the passivation layer --. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 2, 4, 5, 7, 10, 11, 12, 17, 18, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art (APA) in view of Jeon et al (Jeon) USPAT 6,362,858 B1.

As to claims 2, 7, 10, and 12, APA discloses in Figure 8 an in-plane switching liquid crystal display (LCD) device comprising: common electrodes, 54a, alternating and parallel with pixel electrodes, 66a, and a gate line, 50, for a TFT and a common line, 54.

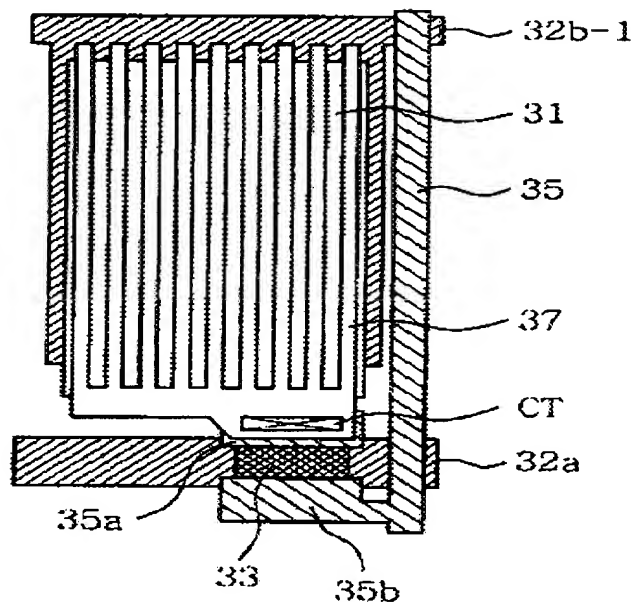
APA discloses in Figures 7A and 7B that the scan line, 2 (gate line), is conventionally formed on the substrate, 1A, and that the reference signal line, 4 (common line), and the reference electrode, 14 (common electrode), are also formed on the same substrate (Applicant's wherein the common electrode is formed on the substrate like the gate line) and are covered by a first insulating film, 11 (gate-insulating layer).

APA does not explicitly disclose transparent pixel and common electrodes and an auxiliary common line.

Jeon discloses in Figures 2A-2E, an in-plane switching LCD device comprising: a gate line, 32a, on a first substrate; a data line, 35, on the first substrate, the data line being perpendicular (as illustrated) to the gate line; a common line, 32b-1, on the first substrate, the common line being parallel (as illustrated) with the gate line and being formed of a metal (Cr for both gate line and common line; col. 2, lines 49-58, especially lines 55-58) (Applicant's wherein the common electrode is formed on the substrate like the gate line); a pixel electrode, 37, (ITO; col. 3, lines 18-22) and the common electrode, 31, (ITO; col. 2, lines 64-67) being formed of a transparent conductive material (ITO); and a liquid crystal layer between the first and second substrates (inherent to

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comprising a LCD device) made by a method that simplifies the process by reducing the mask number.

FIG. 2E

Jeon is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to modify the LCD design to permit manufacture by the method of Jeon to simplify the process by reducing the mask number.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of APA with the

specific layered structure of Jeon to permit manufacture by the simplified process of Jeon to reducing the mask number.

As to claims 4, 5, and 11, Jeon discloses a device further comprising: a first ITO layer (Figures 2A-2C and col. 2, lines 49-52) (Applicant's auxiliary common line) on the first substrate (col. 2, lines 49-67, especially lines 55-58), the auxiliary common line being connected with the common electrode, 31, on the same layer as the gate electrode (formed during same process steps, col. 2, lines 55-58). The first ITO layer of Jeon exists everywhere under the first metal layer of Jeon, forming Applicant's auxiliary lines, it is the same ITO layer that forms the common electrode, and the portion of the ITO layer that is under the common line is connected to the portion of the ITO layer that serves as the common electrode.

Jeon is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to modify the LCD design to permit manufacture by the method of Jeon to simplify the process by reducing the mask number.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of APA with the specific layered structure of Jeon to permit manufacture by the simplified process of Jeon to reducing the mask number.

As to claim 17, Jeon discloses in Figures 2A-2E, in-plane switching Liquid Crystal Display (LCD) device, comprising: a first substrate and a second substrate a gate line,

32a, on the first substrate; a metal common line, 32b, (Cr for both gate line and common line; col. 2, lines 49-58) on the first substrate, the common line parallel (as illustrated) to the gate line, a data line, 35, on the first substrate, the data line being perpendicular (as illustrated) to the gate line; a common electrode, 31, on the first substrate; a thin film transistor having a gate electrode, a source electrode, 35a, and a drain electrode, 35b, formed on the first substrate; liquid crystal interposed between the first and second substrates (inherent to comprising a LCD device); a pixel electrode, 37, contacting the source electrode (Applicant's drain electrode) of the thin film transistor; and wherein, the pixel and common electrodes are formed of a transparent conductive material (ITO; col. 3, lines 18-22, and col. 2, lines 64-67).

Jeon is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to modify the LCD design to permit manufacture by the method of Jeon to simplify the process by reducing the mask number.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of APA with the specific layered structure of Jeon to permit manufacture by the simplified process of Jeon to reducing the mask number.

As to claim 18, Jeon discloses the LCD device of claim 17, wherein a portion of the common line overlies a portion of the common electrode (Figures 2A-2E, especially Figure 2C, and col. 2, lines 49-67, especially lines 64-67).

Jeon is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to modify the LCD design to permit manufacture by the method of Jeon to simplify the process by reducing the mask number.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of APA with the specific layered structure of Jeon to permit manufacture by the simplified process of Jeon to reducing the mask number.

As to claim 33, Jeon discloses the LCD device of claim 17, wherein the transparent conductive material includes indium tin oxide (ITO; col. 3, lines 18-22, and col. 2, lines 64-67).

Jeon is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to modify the LCD design to permit manufacture by the method of Jeon to simplify the process by reducing the mask number.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of APA with the specific layered structure of Jeon to permit manufacture by the simplified process of Jeon to reducing the mask number.

3. Claims 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over APA in view of Jeon, as applied to claims 4 and 12 above, in view of Yoshioka et al (Yoshioka) USPAT 6,323,918 B1.

As to claims 13-15, APA in view of Jeon disclose the device above.

APA in view of Jeon do not explicitly disclose a device further comprising a passivation layer over the gate-insulating layer, a common electrode on the passivation layer, a black matrix on the passivation layer covering the active layer, wherein the black matrix is made of the same material as the pixel electrodes.

Yoshioka teaches in figure 30 (col. 16, line 17 through col. 17, line 15) a device further comprising an insulating film, 105 (Applicant's gate-insulating layer), over the gate line, 114, an interlayer insulating film, 105 and 109, (Applicant's passivation layer) over the gate-insulating layer, a pixel electrode, 110, on the passivation layer, a black matrix, 118, on the passivation layer covering the polysilicon active layer, 102, wherein the black matrix is made of Ti, Cr, or the like (Applicant's the same material as the pixel electrodes) (col. 9, lines 28-37) to form a capacitor comprising the black matrix (Abstract).

Yoshioka is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add a passivation layer over the gate-insulating layer, a common electrode on the passivation layer, a black matrix on the passivation layer covering the active layer, wherein the black matrix is made of the same material

as the pixel electrodes to form a capacitor comprising the black matrix to improve display performance.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of APA in view of Jeon with the passivation layer over the gate-insulating layer, a common electrode on the passivation layer, a black matrix on the passivation layer covering the active layer, wherein the black matrix is made of the same material as the pixel electrodes of Yoshioka to form a capacitor comprising the black matrix to improve display performance.

4. Claims 3, 6, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over APA in view of Jeon, as applied to claims 4 and 17 above, in view of Colgan et al (Colgan) USPAT 6,278,502 B1.

As to claims 3, 6, and 34, APA in view of Jeon discloses the device of claims 4 and 17.

APA in view of Jeon does not explicitly disclose a device wherein the transparent conductive material includes indium zinc oxide (IZO).

Colgan teaches the use of IZO and ITO (col. 2, lines 58-67, col. 3, lines 1-4, col. 3, lines 21-22, and col. 6, lines 6-8) as preferred materials for the formation of transparent conductive layers.

Colgan is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to use IZO as a preferred material for the formation of transparent conductive layers.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of APA in view of Jeon with the IZO of Colgan.

5. Claims 8, 9, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over APA in view of Jeon, as applied to claims 1 and 17 above, in view of Son et al (Son) USPAT US 2002/0008824 A1.

As to claim 8, APA in view of Jeon discloses the device of claim 1.

APA in view of Jeon does not explicitly disclose a device, further comprising a first alignment layer on the first substrate.

Son teaches the use of a first alignment layer on the first substrate to align the liquid crystal molecules (para 0019).

Son is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to use a first alignment layer on the first substrate to align the liquid crystal molecules

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of APA in view of Jeon with the alignment layer of Son.

As to claim 9, APA in view of Jeon discloses the device of claim 1.

APA in view of Jeon does not explicitly disclose a device, wherein the first alignment layer is selected from a group consisting of polyimide and photo-alignment material.

Son teaches a first alignment layer selected from a group consisting of polyimide and photo-alignment material (para 0030).

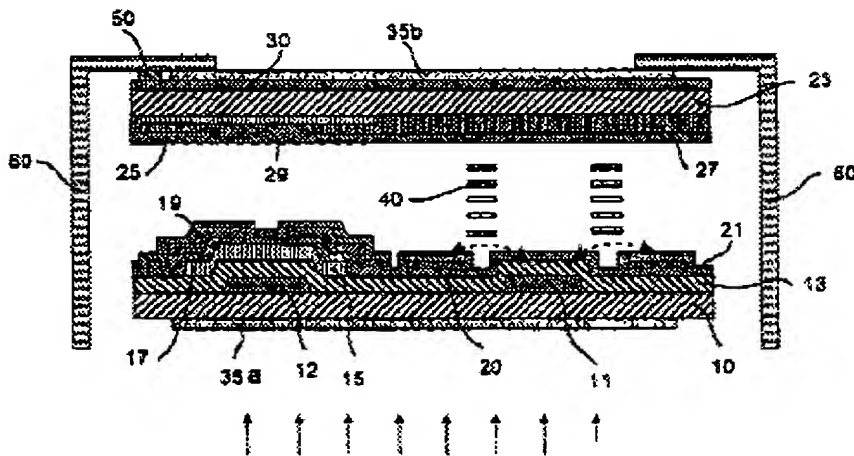
Son is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to use a first alignment layer selected from a group consisting of polyimide and photo-alignment material to align the liquid crystal molecules

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of APA in view of Jeon with the alignment layer of polyimide or photo-alignment material of Son.

As to claim 32, APA in view of Jeon discloses the LCD device of claim 17.

APA in view of Jeon does not explicitly disclose a device, further comprising a black matrix on the second substrate.

FIG. 3



LIGHT SOURCE

Son teaches in Figure 3, an LCD device, further comprising a light-shielding layer, 25, (Applicant's black matrix) on the second substrate, 23, (para 0029).

Son is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to use a black matrix on the second substrate to prevent light from leaking around the TFT (first two lines of para 0029).

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of APA in view of Jeon with the black matrix on the second substrate of Son.

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6. Claims 19, 23-25, and 27-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over APA in view of Jeon, as applied to claims 1 and 17 above, in view of Ishikura et al (Ishikura) USPAT 6,219,125 B1.

As to claim 19, APA in view of Jeon discloses the LCD device of claim 17.

APA in view of Jeon does not explicitly disclose a device wherein a portion of the common electrode overlies a portion of the common line.

Ishikura teaches in Figure 1 (col. 3, lines 34-54) a device wherein a portion of the transparent electrode, 5, (Applicant's common electrode) overlies a portion of the principle electroconductive layer, 12, (Applicant's common line), to improve conductivity and reduce resulting voltage waveform deformation (or distortion) (col. 1, lines 14-39).

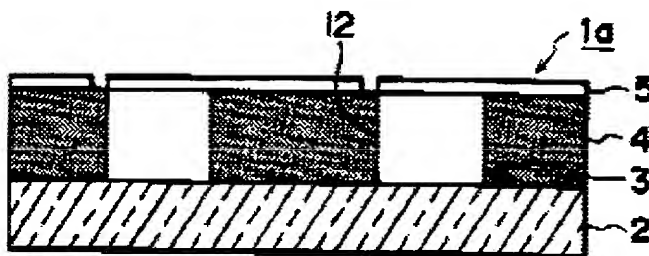


FIG. 1

Ishikura is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add a metal layer under the transparent electrode layer to improve conductivity and reduce resulting voltage waveform deformation (or distortion).

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of APA in view of Jeon with the transparent electrode over the metal conductive layer of Ishikura.

As to claims 23, and 24-25, APA in view of Jeon discloses the LCD device of claim 17 further comprising an auxiliary common electrode under the common line, wherein the common electrode is electrically connected to the auxiliary common electrode.

APA in view of Jeon does not explicitly disclose a device further comprising an auxiliary common electrode covering the common line.

Ishikura teaches in Figure 1 (col. 3, lines 34-54) a device wherein a portion of the ITO transparent electrode, 5, (Applicant's common electrode) overlies a portion of the principle electroconductive layer, 12, (Applicant's common line), to improve conductivity and reduce resulting voltage waveform deformation (or distortion) (col. 1, lines 14-39).

Ishikura is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add a metal layer under the transparent electrode layer to improve conductivity and reduce resulting voltage waveform deformation (or distortion).

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of APA in view of Jeon with the transparent electrode over the metal conductive layer of Ishikura, resulting in an auxiliary common electrode covering the common line, wherein the common

electrode is electrically connected to the auxiliary common electrode and is formed of the same transparent material, ITO.

As to claim 27, APA in view of Jeon discloses the LCD device of claim 23, wherein a common pad at an end of the common line is well known in the art of liquid crystals and would obviously be beneficial to allow easy electrical connection of the driving circuit to the common line.

As to claim 28, 29, and 30, APA in view of Jeon discloses the LCD device of claim 17, further comprising an auxiliary gate line of ITO and a (an auxiliary) gate pad under the gate line and the gate pad (, respectfully).

APA in view of Jeon does not explicitly disclose a device further comprising an auxiliary gate line of ITO and a (an auxiliary) gate pad *under* the gate line and the gate pad (, respectfully).

Ishikura teaches in Figure 1 (col. 3, lines 34-54) a device wherein a portion of the ITO transparent electrode, 5, (Applicant's auxiliary gate line and auxiliary gate pad) overlies a portion of the principle electroconductive layer, 12, (Applicant's gate line and gate pad), to improve conductivity and reduce resulting voltage waveform deformation (or distortion) (col. 1, lines 14-39).

Ishikura is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add a metal layer under the transparent

electrode layer to improve conductivity and reduce resulting voltage waveform deformation (or distortion).

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of APA in view of Jeon with the transparent electrode over the metal conductive layer of Ishikura, resulting in an auxiliary gate line of ITO (same as common electrode ITO) and a (an auxiliary) gate pad *under* the gate line and the gate pad (, respectfully).

7. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over APA in view of Jeon and Choi, as applied to claim 23 above, and further in view of Colgan.

As to claim 26, APA in view of Jeon and Choi discloses the device of claim 23.

APA in view of Jeon and Choi dose not explicitly disclose a device wherein the transparent conductive material includes indium zinc oxide (IZO).

Colgan teaches the use of IZO and ITO (col. 2, lines 58-67, col. 3, lines 1-4, col. 3, lines 21-22, and col. 6, lines 6-8) as preferred materials for the formation of transparent conductive layers.

Colgan is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to use IZO as a preferred material for the formation of transparent conductive layers.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of APA in view of Jeon and Choi with the IZO of Colgan.

8. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over APA in view of Jeon and Ishikura, as applied to claim 28 above, and further in view of Colgan.

As to claim 31, APA in view of Jeon and Ishikura discloses the device of claim 28.

APA in view of Jeon and Ishikura does not explicitly disclose a device wherein the transparent conductive material includes indium zinc oxide (IZO).

Colgan teaches the use of IZO as a substitute material for ITO (col. 2, lines 58-67).

Colgan is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to use IZO as a substitute material for ITO.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of APA in view of Jeon and Ishikura with the IZO of Colgan.

9. Claims 20, 21, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over APA in view of Jeon, as applied to claims 1 and 17 above, in view of Choi et al (Choi) USPAT 6,094,250.

As to claims 20 and 21, APA in view of Jeon discloses the LCD device of claim 17.

APA in view of Jeon does not explicitly disclose a device further comprising storage electrode.

Choi teaches in Figures 2A and 2B an in-plane switched device further comprising storage electrode, 27a (col. 3, line 66 through col. 4, line 12), wherein the storage electrode contacts the pixel electrode, 25, through a storage contact hole, 29f, to reduce cross-talk.

Choi is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add storage electrodes to reduce cross-talk.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of APA in view of Jeon with the storage electrodes connected to the pixel electrode of Choi.

As to claim 22, APA in view of Jeon and further in view of Choi does not explicitly disclose the LCD device of claim 20, wherein the storage electrode is between the pixel electrode and the first substrate. However, mere stacking order is considered obvious

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and therefore not patentably distinct. If the Applicant does not agree, a restriction might be appropriate.

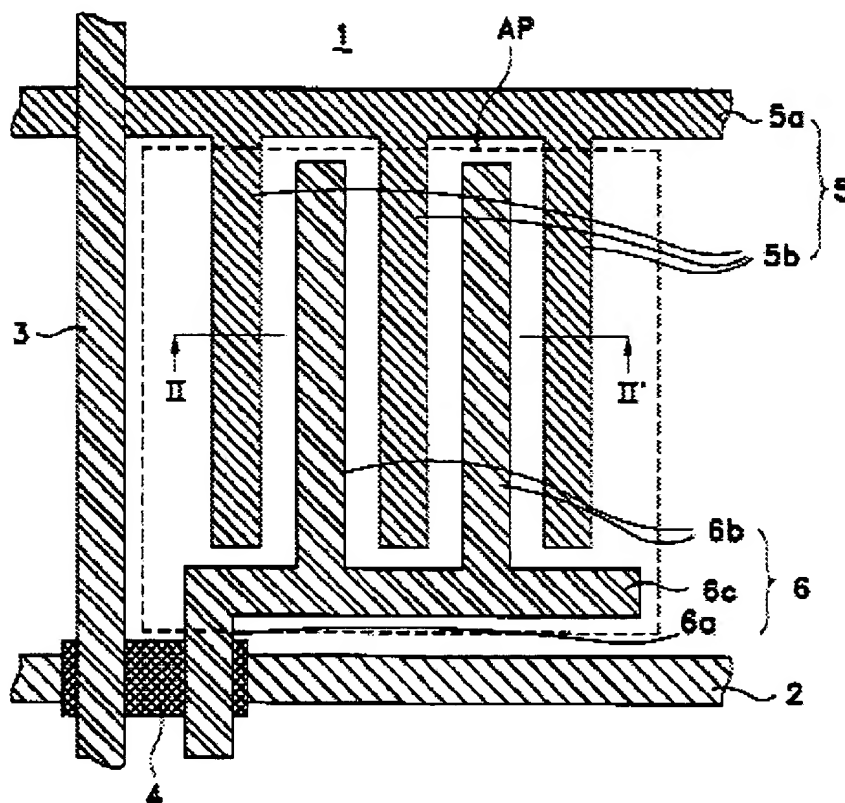
10. Claims 35 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over APA in view of Jeon and Yoshioka as applied to claims above, and further in view of Shin et al (Shin) USPAT 6,356,328 B1.

As to claims 35 and 38, APA in view of Jeon and Yoshioka disclose in Figures 2A-2E, an in-plane switching Liquid Crystal Display (LCD) device, comprising: a first substrate and a second substrate (required) a gate line, 32a, on the first substrate; a metal common line, 32b (Cr for both gate line and common line; col. 2, lines 49-58, especially lines 55-58), on the first substrate, the common line parallel (as illustrated) to the gate line, a data line, 35, on the first substrate, the data line being perpendicular to the gate line; a common electrode, 31, formed of a transparent conductive material (ITO; col. 2, lines 64-67) on the first substrate; a thin film transistor having a gate electrode, 33, a source electrode, 35a, and a drain electrode, 35b, formed on the first substrate; liquid crystal interposed between the first and second substrates (inherent); and a pixel electrode contacting the source (Applicant's drain) electrode of the thin film transistor.

Jeon does not explicitly disclose a pixel electrode formed of an opaque metal.

Shin teaches as prior art in Figures 1 and 2 the use of a pixel electrode, 6b, formed of an opaque metal (col. 2, lines 3-6) in order to block a light of the area in which the liquid crystal molecules are not operated in an in-plane switched LCD.

FIG. 1
(PRIOR ART)



Shin is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add opaque metal electrodes in order to block a light of the area in which the liquid crystal molecules are not operated.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of APA in view of Jeon with opaque metal pixel electrodes of Shin.

11. Claims 16, 36, and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over APA in view of Jeon, Yoshioka, and Shin, as applied to claims above, and further in view of Nakashima, USPAT 6,049,365.

As to claims 16, 36, and 37, APA in view of Jeon, Yoshioka, and Shin disclose the LCD device of claims 15 and 35.

APA in view of Jeon and Shin does not explicitly disclose a black matrix formed of the same opaque metal, Cr, as the pixel electrode.

Nakashima discloses the use of Cr along with numerous other opaque conductive metals (col. 10, lines 25-34) that are well known in the art of liquid crystals for forming layers that will block light, and Nakashima teaches the formation of color filters and a black matrix (col. 10, lines 46-48) as well known in the art. Motivational advantages for the use of Cr are numerous including good electrical conductivity, good corrosion resistance, and good light blocking ability. Motivational advantages for the use of a black matrix are numerous and include improved contrast and elimination of light leaks. Motivational advantages for making the black matrix out of the same material as the pixel electrode include reduced process steps, ease of manufacture by reducing source metal changes, and mutual compatibility with other materials.

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Nakashima is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to form the black matrix and pixel electrode of Cr to achieve high contrast, eliminate light leaks, reduce process steps, and improve product corrosion resistance.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of APA in view of Jeon and Shin with a black matrix and pixel electrode formed of the Cr of Nakashima to achieve high contrast, eliminate light leaks, reduce process steps, and improve product corrosion resistance.

Response to Arguments

13. Applicant's arguments with respect to claims 1-38 have been considered but are moot in view of the new ground(s) of rejection.

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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy L Rude whose telephone number is (703) 305-0418. The examiner can normally be reached on Monday through Thursday.

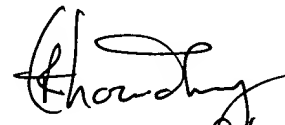
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H Kim can be reached on (703) 305-3492. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4900.



TLR
April 14, 2003

Timothy L Rude
Examiner
Art Unit 2871



T. Chowdhury
Primary Examiner